



## Storage for peak hours

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### NATURAL GAS SUPPLY

To end-users, gas facilities' withdrawal capacity increasingly counts more than volume capacity.

In any year, 20% to 40% of gas in storage is not withdrawn.

### North American Gas Storage Capacity

Companies that focus on merchant natural gas storage are continuing to expand their niche even though during this past fill season, U.S. inventories rose to a five-year high, peaking on October 1 at 3.17 trillion cubic feet (Tcf) of gas-essentially "full."

Even after abnormally large withdrawals in December and early January, the amount of working gas in storage remained about 2% above the five-year average. This suggests that more storage capacity may not be needed. But users do want storage facilities to increase the rate at which gas can be injected and withdrawn. That's because the way they use storage has changed.

Traditionally customers, like the proverbial squirrel, filled a storage reservoir fairly slowly from April to October and withdrew gas as needed throughout the winter cycle from November to March. They moved gas in and out only once or twice a year, in so-called single-cycle facilities. These are depleted oil and gas fields and this type of facility provides more than 80% of U.S. storage capacity.

Gas-fired electric generation is changing that. Electric demand has increased to the point that generators now use storage as a way to satisfy peak load needs year-round. Because power demand varies day to day-even hourly-the market doesn't care about storage capacity so much as the ability to withdraw gas quickly, and replenish it easily.

Active gas marketers and traders-there are still some out there- use storage for arbitrage. Investment-banking firm Friedman Billings Ramsey

speculated last month that the abnormally high withdrawal rates seen so far this winter were partly caused by cash-strapped traders selling gas from storage into the spot market when prices soared above \$5 per thousand cubic feet (Mcf).

But, all players in the industry are protecting their balance sheets by focusing on the value of physical assets, which enhances the role of storage. So while energy merchants had been the fastest-growing customer segment, their retrenchment has resulted in storage operators refocusing on local distribution companies (LDCs), gas producers and large end-users.

"In the last 10 years, gas-fired generation has tripled. You can't do that without affecting gas storage," says John Hopper, president of Falcon Gas Storage Co. in Houston. As the energy-- merchant sector changes and more big gas producers market directly to end-users, storage will be needed more than ever, he says. What's more, as some industrial gas demand is lost, which was typically needed 24/7, it will be replaced by the hourly variable demand of gas-- fired power plants.

"The appetite for gas has grown, but reliable deliverability has been going down," says A.J. (Tony) Clark, principal with SGR Holdings, Houston. The company is currently developing several storage facilities out of salt caverns. "Supply has come into question and so, storage has become more important. Storage is a tool that provides reliability to end-users like LDCs in a tight- supply environment."

How much is enough?

No one denies that storage is increasingly important, but how much additional capacity is required? "We've observed that carry- over capacity for the past several years has been significant, suggesting that incremental capacity is not a key need in North America right now," says Ziff Energy Group's Bill Gwozd, director of gas services and manager of the storage practice from Ziff's Calgary office.

The U.S. Department of Energy says North American storage holds about 8 Tcf of gas, and about 2.5- to 3 Tcf is injected, then withdrawn, each heating season. That leaves so-called cushion gas of close to 5 Tcf, Gwozd says. In the U.S. alone, there are 415 underground storage facilities with working gas capacity of about 3.923 Tcf. The aggregate deliverability is 79.5 Bcf a day.

On any given day, about 60% of the gas used in the U.S. comes from pipelines, 20% is pulled from storage, and the balance is imported from

Canada and LNG sources.

"If we ran down to near zero in working gas each year or utilized some of the 5 Tcf of base gas, that would suggest we need more capacity. But no matter how much gas industry puts into storage each season, there is always some left over," Gwozd says. In 2000, about 25% of the gas in U.S. and Canadian storage was left over at the end of March. In 2001, it was 20%. "At the end of the day, it's not capacity the market needs, it is withdrawal on a peak cold day."

In western Canada, where 8% to 10% of North American storage capacity is located, deliverability and injection capabilities are where enhancements have been made, as opposed to sheer capacity additions. That is the trend throughout North America.

"We see 10% growth in capacity, but 50% to 60% growth in injectivity and withdrawal capability. The rationale is pure economics-it is better to optimize an existing facility by increasing compression or drilling more horizontal wells in the storage reservoir, than to add capacity. The number of times you can cycle in and out is the key."

To prove his point, Gwozd says that since 1990, storage capacity in western Canada has grown two times, while withdrawal rates have grown fourfold, from less than 1.5 Bcf a day to about 6 Bcf a day now.

#### Expansions under way

These trends have created a need for more salt-cavern facilities. Unlike a depleted oil or gas field or aquifer, salt-cavern storage facilities have quicker cycle times for moving gas in and out. Generally, a salt cavern needs only 30% of capacity to serve as base or cushion gas, while an aquifer requires up to 80% and a depleted gas field needs 50%.

Most storage currently is in depleted oil and gas fields and 12% is in aquifers; 4% is in salt caverns. These high-deliverability, multicycle (HDMC) facilities are where growth is occurring. Most of the new salt-cavern sites are capable of cycling gas in and out six to 12 times annually. "A new high-deliverability cavern may hold only 1 Bcf, but its deliverability may be cycled 10 times a year," Gwozd says. "You can deliver gas and replenish it rapidly."

EnCana Corp. owns and operates the most independent (non-utility- or nonpipeline-- owned) storage capacity in North America. Once expansion plans are completed by 2005, it will store 180 Bcf of gas at its facilities in Alberta, California and Oklahoma. Its storage network will boast total peak

withdrawal capacity of 4 Bcf per day. About 20% of the facilities handle EnCana's equity gas production with 45% of capacity leased to third parties under long-term arrangements. The balance is used to capture gas-price spreads.

"Our strategy is to grow our storage business aggressively," says Rick Daniel, EnCana senior vice president of storage. "We do grassroots projects and expansions and we'd certainly look at acquisitions. Since the merger [that formed EnCana a year ago], we are much bigger, so we're looking at our future storage needs as well. The challenge is more on the technical side than on the economics side."

EnCana holds 135 Bcf in Canada, with almost 90 Bcf at the AECO Hub in eastern Alberta. With four large gas plants and four storage pools accessed by 26 wells, its peak withdrawal rates are 2 Bcf a day. Peak injection capacity is 1.8 Bcf a day.

EnCana is doubling capacity at Wild Goose Storage Inc., the only independently owned facility in one of the strongest end-user regions--California. Opened in 1997 near Sacramento, the facility will hold 29 Bcf of gas when the expansion is done by the spring of 2004. The maximum injection rate is being increased to 450 million cubic feet a day from 80 million and the maximum withdrawal rate will go to 700 million a day from 200 million.

Separately, EnCana will soon begin injecting gas into its new Countess facility, a C\$130-million project 53 miles east of Calgary. Countess first produced gas for a predecessor company, PanCanadian Energy, in 1984. Now the depleted field will assume a new role. The first 10 Bcf of capacity will be available in the second quarter, although capacity will eventually total 40 Bcf. Countess has been designed to handle a peak injection rate of nearly 1 Bcf a day and peak withdrawal of 1.25 Bcf a day.

"We are on target to begin injecting gas this summer and allow withdrawals next winter. We have four drilling rigs active and have already drilled nine wells," says Daniel.

Falcon Gas is expanding its business as part of a strategy to buy older single-cycle depleted sites and convert them to HDMC operation. It acquired its first such facility in 2000, the Worsham- Steed gas field in Jack County near Dallas. Redevelopment there will provide up to 12 Bcf of capacity by second-half 2003. It uses the latest technologies from the E&P business, including 3-D seismic data, horizontal drilling and reservoir modeling, to optimally site and develop storage in depleted fields and new

projects.

Falcon has five projects under way. The company's capacity is 21 Bcf of working-gas storage, of which about half is HDMC. Down the road, projects in the Rockies and Desert Southwest are under study. "We have the potential to go to 100 Bcf if all the things we're looking at go forward," Hopper says.

In December, a Falcon joint venture filed an application with the Federal Energy Regulatory Commission (FERC) to convert the Wyckoff gas field in Steuben County, upstate New York, into an HDMC facility under the name Greyhawk Gas Storage Co. A second expansion of its Hill Lake facility in Eastland County, which serves the Dallas-Fort Worth market, is also under way.

Changes in the midstream sector, and their effect on portfolios of many gas aggregators in the market, has masked the true need for gas storage capacity, Hopper says, but that need is becoming more apparent today.

SGR Holdings LLC is building the Southern Pines Energy Center, an 80-acre HDMC site in Greene County, Mississippi, near the Alabama border. It will have 12 Bcf of working-gas storage, 6 Bcf in each of two caverns. Pending FERC approval, it should be in service in early 2004. In an open season concluded last March, SGR received bids for 34 Bcf of capacity, indicating how robust storage demand is in the fast-growing Southeast.

The self-funded company was started in 2000 by storage-industry veterans from Market Hub Partners to build and lease capacity in HDMC salt-cavern sites to utilities and pipelines. Its first salt-cavern facility, the Houston Energy Center in Liberty County 30 miles northeast of Houston, was sold to Aquila Inc. in 2002.

SGR prefers salt-cavern sites because they have the ability to cycle their entire contents up to 12 times a year. Caverns have lower operating costs and no leakage, so the gas is 100% recoverable, whereas a depleted reservoir incurs the costs of workovers to maintain deliverability.

"Salt caverns are very valuable and so, hard to come by. The multiples are 15 times EBITDA," says Tony Clark. "Even in a down market like we've had recently, the Katy [Texas] Storage Hub that Aquila just sold to PacifiCorp Power Marketing Inc. sold at about a 16 times multiple. We can never win a bidding war, and in some cases, the cost to build is cheaper, at least for salt-cavern storage."

Currently SGR is going through the decision phase near Eunice,

Louisiana, north of the pipeline bottlenecks. The Evangeline Parish site is designed to hold 16 Bcf and be connected to at least nine pipelines in the area. "Interconnects are the key to creating options of sources of supply that customers need," Clark says. "Economics are tight for storage developers. If you are too far from the interconnects, that adds to your cost if you have to lay new pipeline."

Clark feared the demise of the energy-merchant sector would adversely affect the storage business, but utilities and producers still need to manage their supplies and risk. "They want to control their own destiny now, so rather than go through those middlemen, they are now contracting directly with storage facilities. And we don't think the merchant business is entirely gone. It will reinvent itself with a sense of reality and new players."

#### Investor interest

Storage is attracting some new financial interest. "The beauty of it is, we keep hearing about gas being the fuel of choice," says Allan C. Wisk, a partner at Bracewell & Patterson LLP in Dallas, who counts gas storage as one of his areas of expertise. "Post-Enron, as things settle down, trading of gas will have to come back, but with different players involved. This underscores the need to store gas and the ability to deliver it to the market at the right time, when economics are right or demand is high."

"So I think storage will grow in importance." Falcon's Hopper says attracting capital is difficult for any energy sector, more so if talking about infrastructure such as storage. "After Warren Buffett made two huge purchases of pipelines in distress, everybody is looking for that, and they are surprised to learn that storage is not distressed."

Although private-equity investment firm Quantum Energy Partners has nine E&P companies in its portfolio and no storage investments, that may soon change, as talks are under way on two possible deals. "We've been spending a tremendous amount of time analyzing opportunities in the gas-storage sector during the last few months," says managing partner Wil Van Loh. "It's been eye-opening."

"To buy E&P properties intelligently is very hard right now, so we thought, where else might there be value? Obviously there is a lot of turmoil in the midstream and energy-merchant sector." Maybe a dozen companies in the U.S. are trying to build greenfield merchant storage sites, he adds.

The average salt-cavern facility costs \$16- to \$22 million per Bcf of working gas capacity to buy, but these can be built for \$5- to \$7 million, so there is good arbitrage in building and then selling a facility. Van Loh

estimates a return on equity of at least 25% when building a greenfield HDMC, salt-cavern facility.

"As long as you enter into contracts to rent that capacity and are close to big markets, such as Pittsburgh or New York City, a 25% return on equity is doable. What concerns us is that the biggest customers for this kind of storage have been the traders and many of those guys are gone. There is no doubt that the gas-fired generators need HDMC storage."

These recent storage acquisitions indicate the market for HOW facilities is about 15 times earnings. It costs less to build new facilities.

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